

Temă - C3

$$1. H(s) = \frac{s^2}{s^2 + \frac{R}{L}s + \frac{1}{LC}} = \frac{s^2 + \frac{R}{L}s + \frac{1}{LC} - \frac{R}{L}s - \frac{1}{LC}}{s^2 + \frac{R}{L}s + \frac{1}{LC}}$$

$$= 1 + \frac{-\frac{R}{L}s - \frac{1}{LC}}{s^2 + \frac{R}{L}s + \frac{1}{LC}}$$

$$\dot{x}(t) = \begin{pmatrix} -\frac{R}{L} & -\frac{1}{LC} \\ 1 & 0 \end{pmatrix} \cdot x(t) + \begin{pmatrix} 1 \\ 0 \end{pmatrix} u(t)$$

\Rightarrow

$$y(t) = \begin{pmatrix} -\frac{R}{L} & -\frac{1}{LC} \end{pmatrix} x(t) + (1) \cdot u(t)$$

$$2. H(s) = \frac{3s^2}{2s^2 + s + 1} \Rightarrow \frac{3}{2} \frac{s^2}{s^2 + \frac{1}{2}s + \frac{1}{2}} = \frac{3}{2} \frac{s^2 + \frac{1}{2}s + \frac{1}{2} - \frac{1}{2}s - \frac{1}{2}}{s^2 + \frac{1}{2}s + \frac{1}{2}}$$

$$= \frac{3}{2} \left(1 + \frac{-\frac{1}{2}s - \frac{1}{2}}{s^2 + \frac{1}{2}s + \frac{1}{2}} \right) = \frac{3}{2} + \frac{-\frac{3}{4}s - \frac{3}{4}}{s^2 + \frac{1}{2}s + \frac{1}{2}}$$

$$\dot{x}(t) = \begin{pmatrix} -\frac{1}{2} & -\frac{1}{2} \\ 1 & 0 \end{pmatrix} \cdot x(t) + \begin{pmatrix} 1 \\ 0 \end{pmatrix} u(t)$$

$$y(t) = \begin{pmatrix} -\frac{3}{4} & -\frac{3}{4} \end{pmatrix} x(t) + \left(\frac{3}{2} \right) u(t)$$